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ABSTRACT

This learning module offers a five-hour class schedule for discussion and study of the overall U.S. energy system including resources, consumption rates, governmental plans and regulations, energy/conservation problems and techniques, and energy/conservation programs. The module includes a pre-post test, suggested class activities, a basic vocabulary list, and diagrammatic presentation of information. (CP)

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CRISIS - ENERGY

U S DEPARTMENT OF HEALTH,
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Alexander O'Brien
Solar Energy Education Project

CE 023 650

The Crisis-Energy unit is designed to acquaint the students to the energy problems that the world is experiencing at the present time. With the use of the A-V materials the student can see the serious implications of the energy shortage and relate to the problem more readily.

An aware citizen is our most important resource and upon completing this unit the student should be better informed about the energy crisis and how it affects them.

The enclosed materials are based on the 3M Company's energy program.

OBJECTIVES

1. To enhance the students' knowledge of the size of our "energy system.
2. To introduce the available resources of coal, oil, natural gas and nuclear power to the students.
3. To review the world-wide energy production/consumption of energy.
4. To view the energy programs of previous U. S. Presidents.
5. To discuss President Carter's Energy Plan and also the Department of Energy.
6. To encourage the students to be aware of current energy/conservation problems and techniques.
7. To study the influences on energy programs.
8. To review personal contributions to energy saving.

PRE-POST TEST

1. Is there such a thing as an "energy crisis"? Yes____ No____

2. Can an "energy crisis" have an effect on you personally? Yes____ No____

3. Is the energy crisis a world-wide problem? Yes____ No____

4. Are energy related articles found in the newspaper often? Yes____ No____

5. Can power groups influence energy programs? Yes____ No____

6. Can the fuel we use now be replaced later? Yes____ No____

7. What different sources of energy does our nation use regularly to keep everything going?

1._____ 5._____

2._____ 6._____

3._____ 7._____

4._____

8. List two examples fo fossil fuels.

1._____ 2._____

9. What country is the greatest energy consumer?

_____

10. Is more energy wasted or used per day in the United States?

_____

11. What countries have most of the oil in the world?

1._____ 2._____

12. What is OPEC?

_____

13. Which of the following Presidents had an extensive energy program?

President Nixon _____ President Johnson _____

President Carter _____ President Ford

14. Who can help conserve our energy?

_____

_____

15. List ways <u>you</u> can help conserve energy.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

ACTIVITIES

Day 1 - Introduction

1. Administer pre-test.

2. Review "Energy - What's Happening This Week".

   a. Introduce the topic and encourage students to review the papers for energy related articles.

   b. Discuss transparency and what it means.

Day 2 - Energy System

1. Have the class list in decreasing order the five sources of energy that we use today.

   a. Pick out a few sample answers comparing them and asking why that particular order was selected.

   b. Have the entire class vote on the rank order developed to see how closely it comes to the predetermined answers (transparency).

2. Review the "Size of the Energy System" transparency discussing the specific numbers assigned for each major source.

   a. Discuss also total consumption and amount wasted.

   b. Have the class list possible ways they can think of how energy is wasted. (Can be assigned for homework.)

Day 3 - Resources/Energy Production

1. Review the "Resources" transparency comparing the estimated supplies available throughout the world.

   a. Have the students develop a bar graph based on the figures given.

Day 3, Continued

b. Have the children think about why certain areas/countries are more productive than others.

2. Review "World Wide Energy Production/Consumption" transparency comparing the production/consumption in various parts of the world.

   a. Have the students list the areas that have greater consumption than production; greater production than consumption; approximately equal production/consumption figures.

   b. Which areas seem to lead in energy consumption?

   c. Which areas tend to lead in energy production?

   d. Is any area dependent on other areas for energy?

Day 4 - Governmental Programs and Organizations

1. Review the "Presidential Energy Programs" transparency.

   a. Trace the development of an energy program through the last few presidents and their emphasis on energy.

   b. Have the students try and surmize why the presidential emphasis started to increase with President Nixon.

2. Discuss President Carter's "Energy Program", analyzing it and questioning why each one of those things are mentioned.

   a. Compare the "new" and "old" energy organizations.

   b. Have the students decide whether the "new" organization is better than the "old" organization.

3. Review "Priority Future Needs".

   a. Discuss the time frame and the reasons for it.

Day 4, Continued

b. What might happen if the time frame is not met.

Day 5 - People and Energy

1. Review the "Power Groups" transparency, questioning the students as to why these groups are "power" groups.

   a. Ask the students if individuals can exert as much pressure as groups. Why or why not.

   b. Do these groups work together, independently or antagonistically with each other.

   c. Ask the students if their parents are involved with any of these groups and have they contributed to any energy d cisions.

2. Discuss "Personal Contributions" transparency, reviewing what each individual can do.

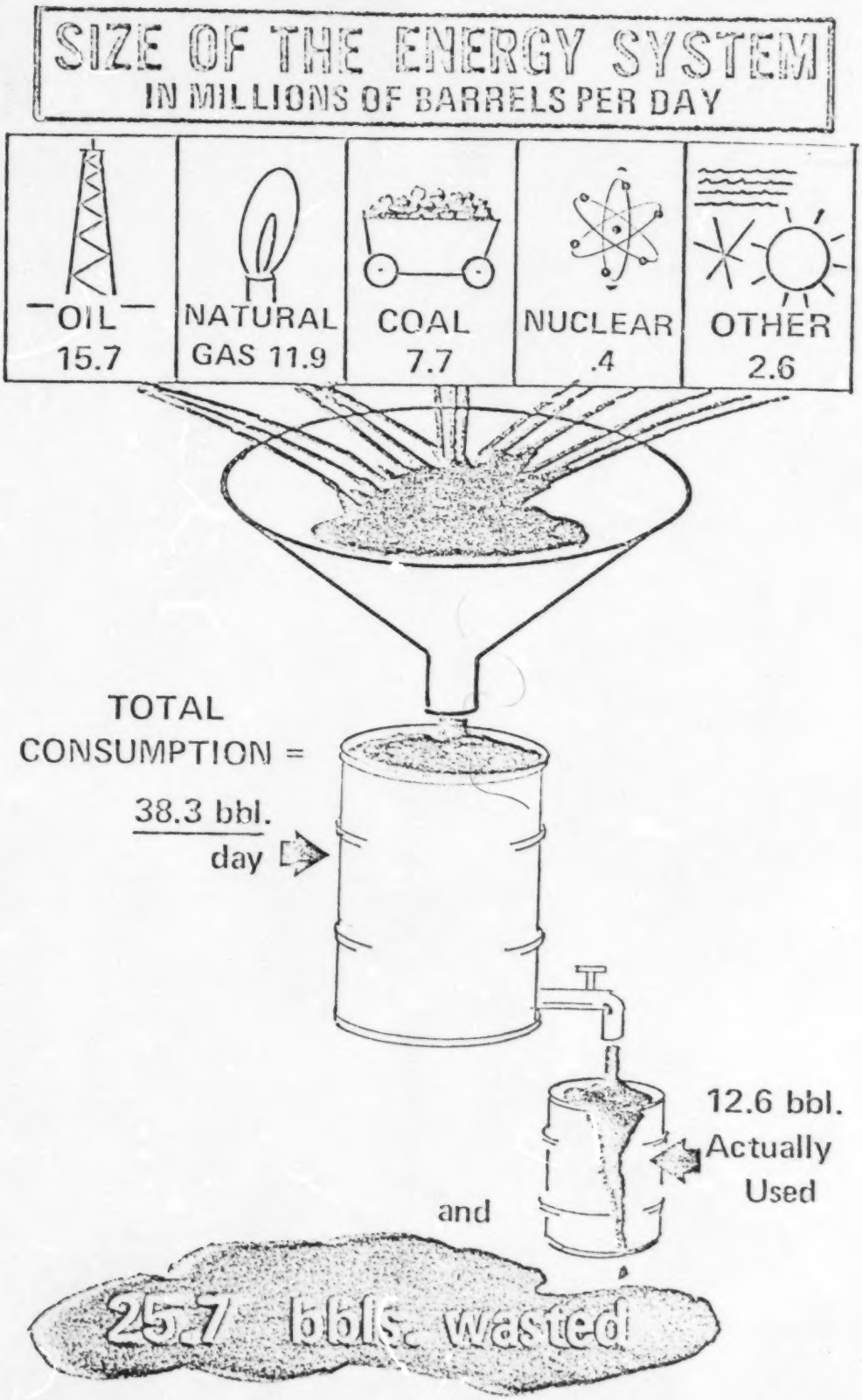
3. Administer post-test.

VOCABULARY

ENERGY	- ability to do work.
CONSUMPTION	- the using up of energy.
OCEANIA	- islands in the Pacific Ocean.
NUCLEAR (atomic)	- energy released from an atomic reaction.
PRODUCTION	- to make something of value.
SOLAR	- energy from the sun.
E.R.D.A.	- Energy Research & Development Administration
GEOTHERMAL	- heat from the earth's interior.
BIOMASS	- the total mass or amount of living things in a particular area.
BREEDER REACTOR	- nuclear reactor that in addition to generating atomic energy, creates additional fuel by producing more fissionable material than it consumes.
RENEWABLE	- to use over again.
NON-RENEWABLE	- cannot be used again.
CONSERVATION	- care and protection of natural resources from loss or waste.
CRISIS	- a turning point in the course of anything; decisive or crucial time, stage or event.
POWER GROUPS	- influences such as unions, industry and government affecting the use of energy.
O.P.E.C.	- Organization of Petroleum Exporting Countries

TRANSPARENCY

MASTERS


SIZE OF THE ENERGY SYSTEM
IN MILLIONS OF BARRELS PER DAY
OIL
15.7
NATURAL
GAS 11.9
COAL
7.7
NUCLEAR
.4
OTHER
2.6
TOTAL
CONSUMPTION =
38.3 bbl.
day
12.6 bbl.
Actually
Used
and
25.7 bbls. wasted

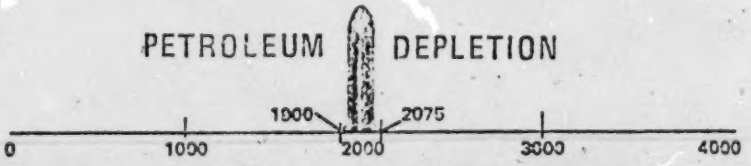
RESOURCES

(estimated available supplies)

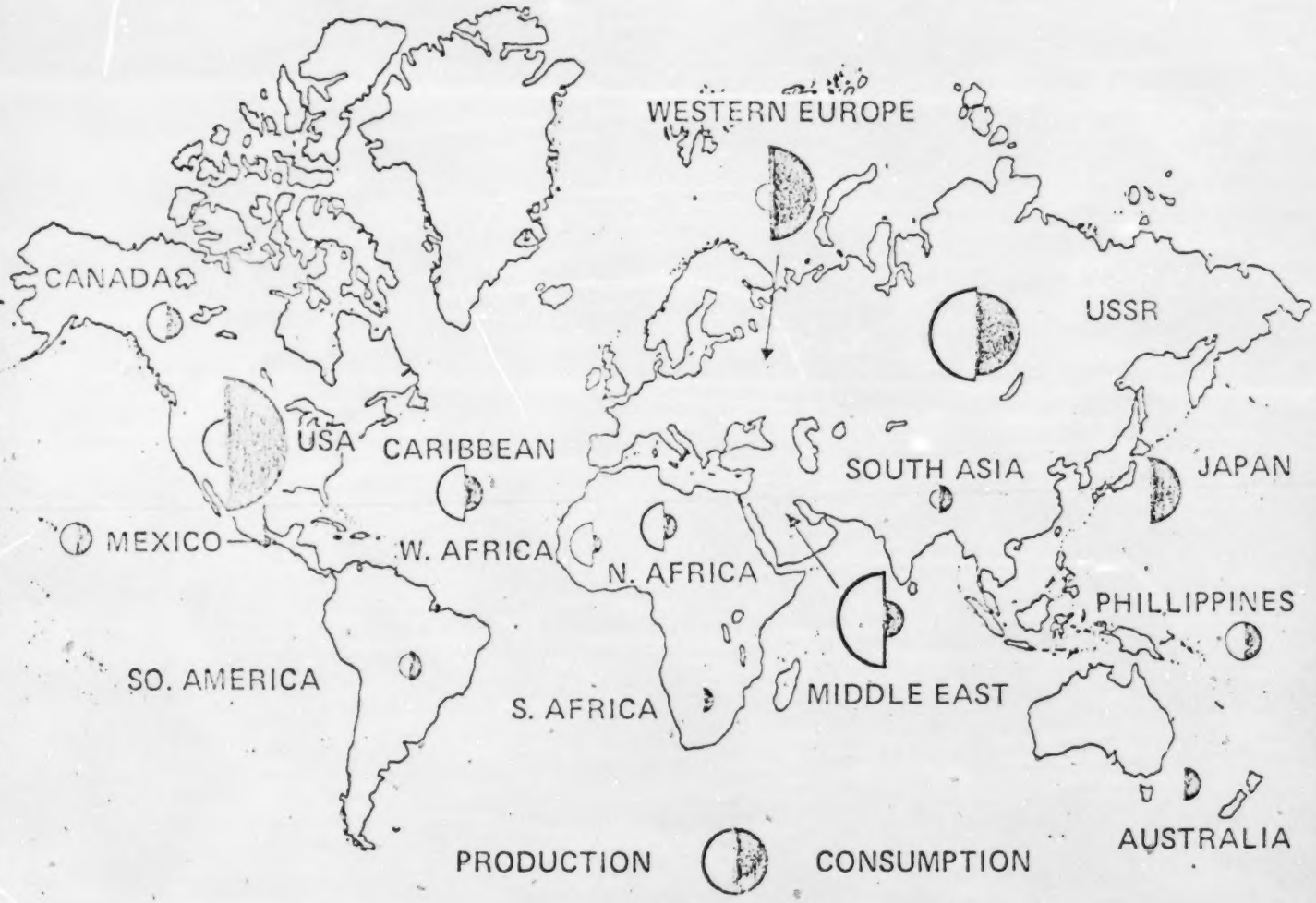
RESOURCES	U.S.A.	WESTERN HEMISPHERE	WESTERN EUROPE	MIDDLE EAST	AFRICA	U.S.S.R. and SATELLITES	FAR EAST AND OCEANIA
OIL billions of barrels	33	38	16	316	60	66	16
NATURAL GAS trillion cubic feet	245	134	156	624	245	714	112
COAL billion short tons	213	7	73	none	20	305	47
NUCLEAR (uranium) thousand short tons	358	217	65	none	304	not reported	141

13

14



WORLD WIDE ENERGY PRODUCTION – CONSUMPTION



PRESIDENTIAL ENERGY PROGRAMS

JOHNSON: None

NIXON: "Self sufficiency by 1985": Conservation (speed limit of 55 m.p.h.), development of new resources.

FORD: "W.I.N." Program: Development of 200 nuclear plants; 150 coal-fired utility plants, 250 new coal mines, 30 oil refineries; abandon oil/gas price controls; E.R.D.A. established.

CARTER: Total national energy program to be accomplished by 1985:

- Reduce energy consumption growth rate by more than 2%.
- Reduce gasoline consumption 10%
- Cut imports of foreign oil to under 6 million barrels/day (less than present)
- Establish strategic petroleum reserve
- Increase coal production
- Insulate 90% American homes, all new buildings.
- Use solar energy in over 2½ million homes.

CARTER'S ENERGY PROGRAM

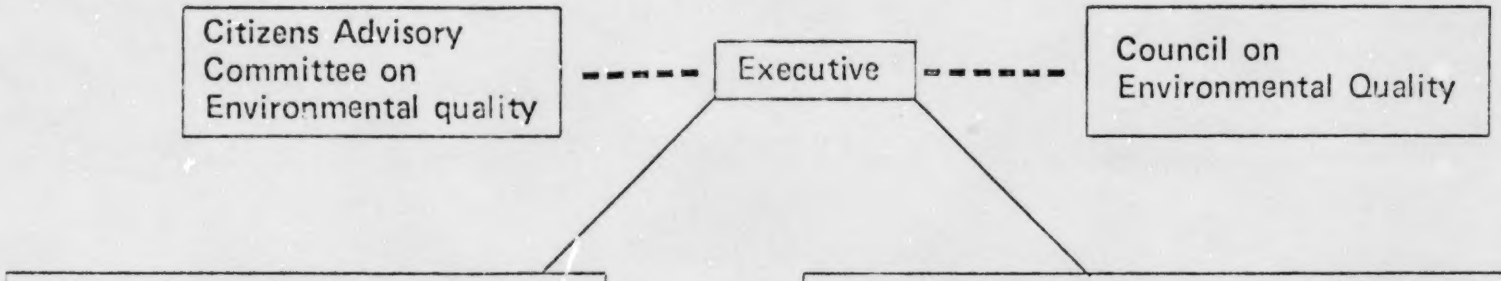
▷ Establishment of New Cabinet Department of Energy

OIL Domestic oil wellhead taxes (3 stages), continue Federal price controls. Price on new oil to rise in '79, raise old oil prices by taxes, control dispersement of Alaskan oil, stockpile 1 billion barrel supply, establish "world level" price on deep formation (hard to get) oil—perhaps gasoline rationing.

NATURAL GAS Raise prices under Government control throughout U.S.A., tax industries and utilities using gas; exemptions for farm use, encourage importation of liquid natural gas. Utilities and industry to switch to coal by 1990.

COAL All utilities and industry to switch to coal, retain strict pollution standards, expand research. **SOLAR** tax credits through '84 for those who install solar units. **NUCLEAR** Encourage use of uranium, not plutonium; license steam plants. **ELECTRICITY** new rates by consumer class—industrial or residential, rates set on daytime demand and seasonal factors. **CONSUMERS** More taxes on gasoline if use increases after '79, high taxes on "gas guzzler" autos, insulation tax credits.

FORMER GOVERNMENT ENERGY ORGANIZATION



CABINET DEPTS. IN ENERGY

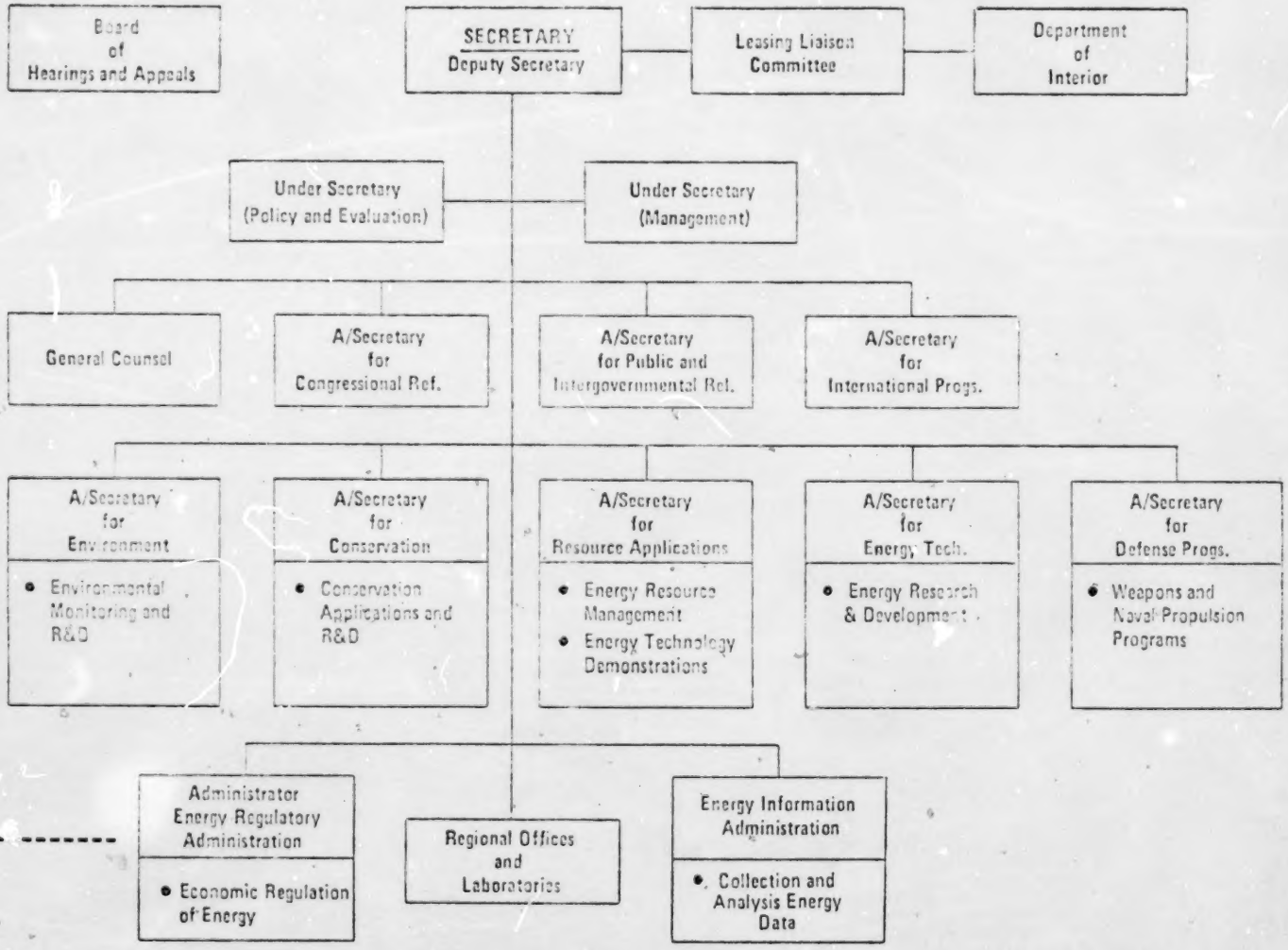
- INTERIOR
- AGRICULTURE
- COMMERCE
- DEFENSE
- HOUSING, URBAN DEVELOPMENT
- TRANSPORTATION

INDEPENDENT AGENCIES IN ENERGY

- ENERGY RESEARCH & DEV'T. ADM.
- ENVIRONMENTAL PROTECTION AGENCY
- FEDERAL ENERGY ADMINISTRATION
- FEDERAL POWER COMMISSION
- INTERSTATE COMMERCE COMMISSION
- NUCLEAR REGULATORY COMMISSION
- TENNESSEE VALLEY AUTHORITY
- SECURITIES and EXCHANGE COMMISSION

The Carter Plan for New Cabinet Department of Energy Will Transfer 19,767 Employees and 10.6 Billion Dollars From These Departments and Agencies.

NEW DEPARTMENT OF ENERGY

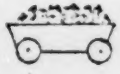

Board of Hearings and Appeals
SECRETARY
Deputy Secretary
Leasing Liaison Committee
Department of Interior
Under Secretary (Policy and Evaluation)
Under Secretary (Management)
General Counsel
A/Secretary for Congressional Rel.
A/Secretary for Public and Intergovernmental Rel.
A/Secretary for International Progs.
A/Secretary for Environment
• Environmental Monitoring and R&D
A/Secretary for Conservation
• Conservation Applications and R&D
A/Secretary for Resource Applications
• Energy Resource Management
• Energy Technology Demonstrations
A/Secretary for Energy Tech.
• Energy Research & Development
A/Secretary for Defense Progs.
• Weapons and Naval Propulsion Programs
Administrator Energy Regulatory Administration
• Economic Regulation of Energy
Regional Offices and Laboratories
Energy Information Administration
• Collection and Analysis Energy Data

ERDA* - PRIORITY FUTURE NEEDS

Near Term: Now–1985

We must:

- Conserve
  - Fuel
  - Power
- Sharpen efficiencies
  - Industrial
  - Transportation
- Convert waste materials to energy
- Increase U.S.A.
  - supply and use of coal



  - supply and use of nuclear tools

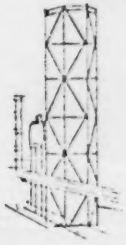
- Improve/Increase oil recovery

*Energy Research and Development Administration

Mid-Term: 1986–2000

We must:

- Convert coal to gaseous fuel
- Extract oil from shale

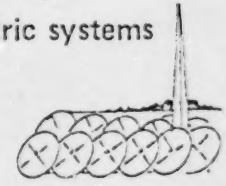


- Develop
  - Geothermal systems
  - Waste heat utilization
- Increase use of solar heating/cooling
- Sharpen electricity conversion/transforming efficiencies
- Develop significant petroleum fuel storage

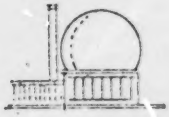
Long Term: 2001+

We must develop:

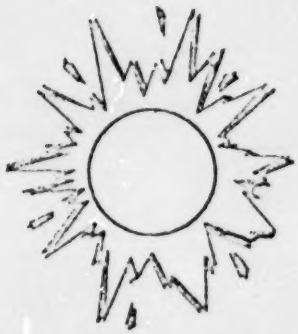
- Solar electric systems



- Breeder reactors
- Nuclear fusion energy systems

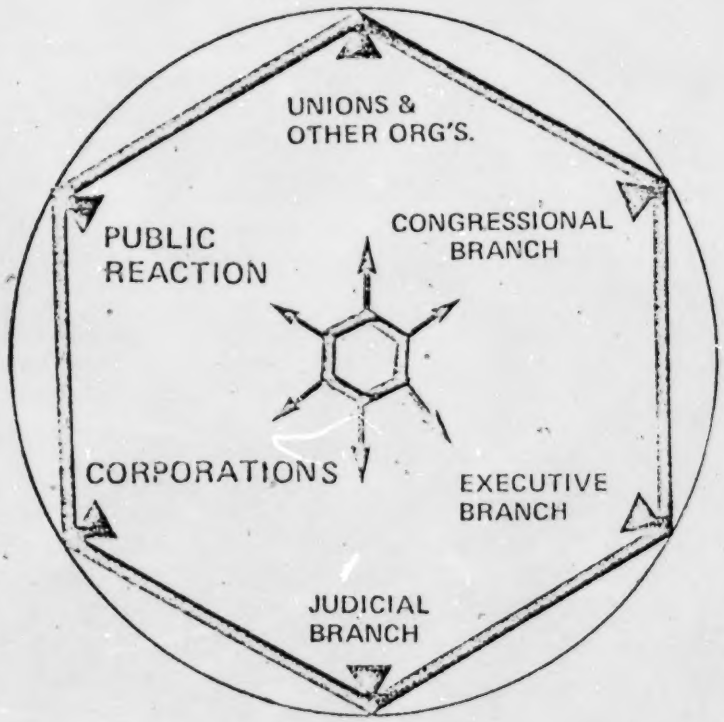


- Biomass energy systems
- Hydrogen energy systems
- Electric transportation systems



ENERGY: What's Happening This Week?

CHANGES COME THROUGH

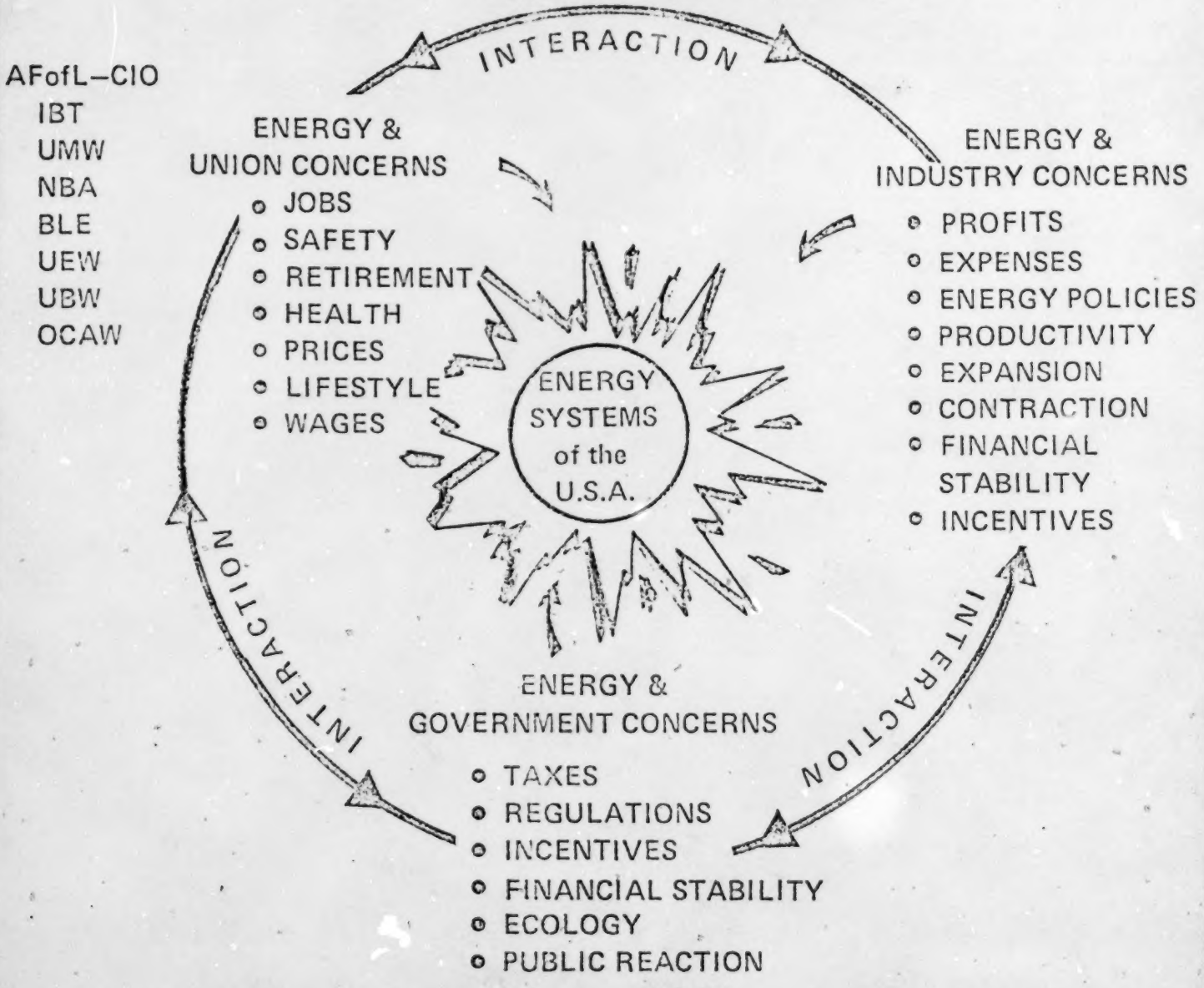


AMERICA, THE REPUBLIC, RESPONDS TO CRISES THROUGH–

- TAXES
- REGULATIONS
- INCENTIVES

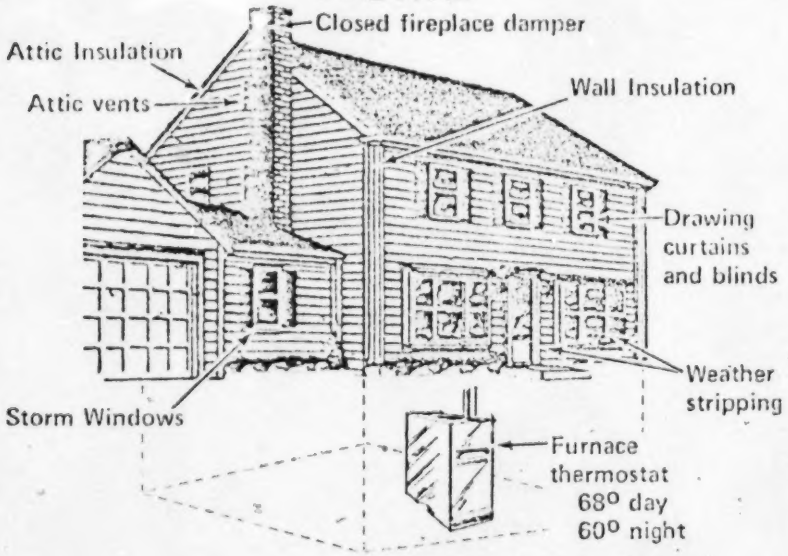
What changes are in the news? Who's responding—how?

THREE GREAT POWER GROUPS AFFECT ENERGY PROGRAMS

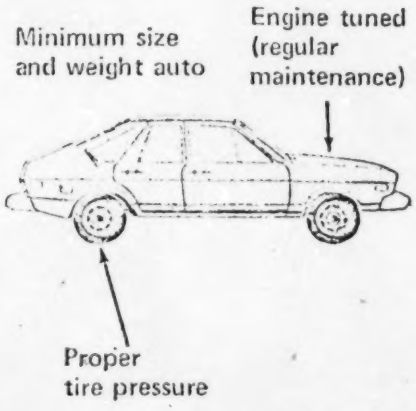


PERSONAL CONTRIBUTIONS
to Energy Savings

HOME



AUTO



OTHER SAVINGS

Turning Out Unused Lights

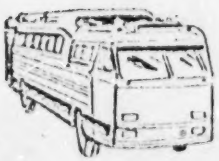
Purchasing energy-thrifty appliances

Careful use of Hot Water

Washers on all faucets

Bicycling

Walking



Using Public Transportation

Other Savings? _____ _____

_____ _____